



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2002/00018

October 17, 2002

Mr. Barron Bail, District Manager
BLM - Prineville District
P.O. Box 550
3050 NE 3rd Street
Prineville, OR 97754

Re: Formal Section 7 Consultation and Essential Fish Habitat Consultation on the Effects of Ongoing and Proposed Bureau of Land Management Activities in the Lower Deschutes River Subbasin, Oregon, for 2002-2004.

Dear Mr. Bail:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to Section 7 of the Endangered Species Act (ESA) on the effects of the Bureau of Land Management's (BLM) Ongoing and Proposed Activities in the Lower Deschutes River Subbasin, Oregon, for 2002-2004. NOAA Fisheries concludes in this Opinion that the proposed actions are not likely to jeopardize the subject species. As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are reasonable and appropriate to minimize the impact of incidental take associated with this action.

This Opinion also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation Management Act and implementing regulations at 50 CFR Part 600.

Please direct any questions regarding this consultation to Scott Hoefer of my staff in the Oregon Habitat Branch Office at (503) 231-6938.

Sincerely,

Michael R. Couse
f.i.

D. Robert Lohn
Regional Administrator

cc: Jeff Dillon, USFWS
Steve Pribyl, ODFW



Endangered Species Act - Section 7 Consultation
&
Magnuson-Stevens Act
Essential Fish Habitat Consultation


BIOLOGICAL OPINION

Effects of Ongoing and Proposed Bureau of Land Management Activities
in the Lower Deschutes River Subbasin, Oregon, for 2002-2004.

Agency: Bureau of Land Management

Consultation
Conducted By: NOAA Fisheries,
Northwest Region

Date Issued: October 17, 2002

Issued by: *for* 
D. Robert Lohn
Regional Administrator

Refer to: 2002/00018

TABLE OF CONTENTS

1. ENDANGERED SPECIES ACT	<u>1</u>
1.1 Background	<u>1</u>
1.2 Proposed Actions	<u>1</u>
1.3 Biological Information	<u>4</u>
1.4 Evaluating the Proposed Actions	<u>5</u>
1.4.1. Biological Requirements	<u>6</u>
1.4.1.1 Population Viability	<u>6</u>
1.4.1.2 Habitat Elements	<u>7</u>
1.4.2. Environmental Baseline	<u>7</u>
1.5 Analysis of Effects	<u>9</u>
1.5.1 Effects of Proposed Actions	<u>9</u>
1.5.2 Cumulative Effects	<u>12</u>
1.6 Conclusion	<u>12</u>
1.7 Conservation Recommendations	<u>13</u>
1.8 Reinitiation of Consultation	<u>13</u>
2. INCIDENTAL TAKE STATEMENT	<u>13</u>
2.1 Amount or Extent of Take	<u>13</u>
2.2 Effect of the Take	<u>14</u>
2.3 Reasonable and Prudent Measures	<u>14</u>
2.4 Terms and Conditions	<u>15</u>
3. MAGNUSON-STEVENSON ACT	<u>17</u>
3.1 Background	<u>17</u>
3.2 Magnuson-Stevens Fishery Conservation and Management Act	<u>17</u>
3.3 Identification of EFH	<u>18</u>
3.4 Proposed Actions	<u>18</u>
3.5 Effects of the Proposed Actions	<u>19</u>
3.6 Conclusion	<u>19</u>
3.7 EFH Conservation Recommendations	<u>19</u>
3.8 Statutory Response Requirement	<u>19</u>
3.9 Supplemental Consultation	<u>19</u>
4. LITERATURE CITED	<u>20</u>

1. ENDANGERED SPECIES ACT

1.1 Background

On January 23, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a January 8, 2002, letter from the Bureau of Land Management (BLM), Prineville District, Deschutes Resource Area, requesting formal consultation regarding the potential effects of their ongoing and proposed activities on Middle Columbia River (MCR) steelhead. The accompanying biological assessment (BA) described ongoing and proposed actions and the environmental baseline, and addressed the effects of those ongoing and proposed BLM actions on MCR steelhead in the Lower Deschutes River and tributaries within the BLM's Deschutes Resource Area. NOAA Fisheries issued a biological opinion (Opinion) for these same activities in 2000 and 2001 on July 28, 1999.

NOAA Fisheries listed the MCR steelhead (*Onchorynchus mykiss*) as threatened under the Endangered Species Act (ESA) on March 25, 1999 (64 FR 14517). NOAA Fisheries issued protective regulations under section 4(d) of the ESA on July 10, 2000 (65 FR 42422).

The objective of this Opinion is to determine whether the subject ongoing activities for calendar years 2002, 2003, and 2004 are likely to jeopardize the continued existence of MCR steelhead.

1.2 Proposed Actions

The BA submitted to NOAA Fisheries describes six categories of actions to be conducted by the BLM within the Deschutes Resource Area: (1) Guide and outfitter program; (2) emergency boat removal; (3) road maintenance; (4) trail maintenance; (5) campground, day use area, and boat ramp maintenance; and (6) annual MCR steelhead spawning surveys. The BLM determined in the BA, that the trail maintenance and campground, day use, and boat ramp maintenance are "may affect, but not likely to adversely affect" (NLAA) actions regarding MCR steelhead. As such, NOAA Fisheries concurs with the NLAA determination and therefore, these actions will not be discussed further in this Opinion. NOAA Fisheries concurs with the NLAA determination because trail maintenance is generally limited to trimming brush and removing rocks from the trail surface, and the amount of sediment input and vegetation removal associated with campground, day use area, and boat ramp maintenance is negligible. The other four actions (guide and outfitter permit program, emergency boat removal, road maintenance, and steelhead spawning ground surveys) were determined by the BLM to be "may affect, and likely to adversely affect" (LAA) actions relative to MCR steelhead. Those LAA actions are the subject of this Opinion.

Guide and Outfitter Permit Program.

The BLM is the lead agency in managing commercial boating recreation use on the Lower Deschutes River. The BLM annually administers 111 commercial permits for whitewater rafting and fishing guides on the mainstem Deschutes River. Approximately 60% of the permittees are fishing guides, 35% whitewater guides, and 5% are outfitters that deliver rental boats to the put-

in points. The BLM's 1993 Deschutes River Management Plan established 1990 boating use figures as a baseline which is not to be exceeded, and defined where and when motorized boats could be used. In 1999, the BLM implemented a moratorium on the issuance of new commercial boating permits for the Lower Deschutes. This closed the Deschutes River to issuance of new guide and outfitter permits, thus preventing a further increase in commercial boating recreation on the river.

Angling methods and bag limits for gamefish species (including MCR steelhead) on the Deschutes River are regulated by the Oregon Department of Fish and Wildlife (ODFW) through the annual issuance of Oregon Sport Fishing Regulations. The 2002 edition of those fishing regulations prohibits fishing from a floating device, and requires that anglers beach their boats and fish from shore or by wading in the river. This regulation has been in effect for several years.

For purposes of administration, the BLM has divided the river into four segments based on geographic features, public road access, and recreational use patterns (BLM *et al.* 1993). The upper part of Segment 1 (Segment 1A) is the 13-mile stretch from Pelton Reregulating Dam, at river mile (RM) 100, downstream to Trout Creek Campground (RM 87). The lower part of Segment 1 (Segment 1B) is the 28-mile stretch from Trout Creek to the Deschutes Club locked gate (RM 59). Segment 2 is a 15-mile stretch from the locked gate to Sherars Falls (RM 44). Segment 3 is a 21-mile stretch from Sherars Falls to Macks Canyon (RM 23). Segment 4 is a 23-mile stretch from Macks Canyon to the confluence of the Deschutes with the Columbia River. Motorized boating is allowed only in Segments 3 and 4, with Segment 4 receiving most of the motorized boating use.

Segment 1A is a popular fishing reach with limited whitewater boating opportunities. Segment 1A is also accessible by vehicle and by hiking trails. Segment 1B provides both fishing and whitewater boating, and is accessible primarily by boat with some limited vehicle access points. A total of 36,314 float boaters (both commercial and private) used Segment 1 between May 15 and September 15, 2001. This represents a 32.3% decrease from the 1990 base figure (53,600), which was established by the BLM's 1993 Lower Deschutes River Management Plan. Commercial boating use is restricted on all weekend days from Memorial Day weekend to Labor Day weekend in Segments 1. Segment 1A and part of Segment 1B (down to the northern boundary of the Warm Springs Indian Reservation at RM 69) are open to trout fishing between April 27 and October 31 and to MCR steelhead fishing between April 27 and December 31. Downstream from the Warm Springs Indian Reservation boundary at RM 69, the Deschutes River is open to both trout and steelhead fishing the entire year (ODFW 2002).

Segment 2 is the river's most heavily used section. The entire length of this segment is accessible by gravel or paved road, and the railroad also parallels the river. It is used primarily by whitewater boaters during the summer and by trout and steelhead anglers during other times of the year. A total of 76,708 float boaters (both commercial and private) used Segment 2 between May 15 and September 15, 2001. This represents a 3.5% increase from the 1990 base

figure (74,100). Commercial boating use is restricted in Segment 2. This river segment is open to both trout and steelhead fishing the entire year (ODFW 2002).

Segment 3 is used mainly by steelhead fishermen in the fall and whitewater boaters in the summer. The entire reach is accessible by gravel road, and the railroad parallels the river on the opposite side of the road. Motorized boating is allowed in Segment 3. A total of 9,558 boaters (both commercial and private; motorized and float) used Segment 3 between May 15 and September 15, 2001. This represents a 31.2% decrease from the 1990 base figure (13,900). This river segment is open to both trout and steelhead fishing the entire year (ODFW 2002).

Segment 4 is used mainly by fall steelhead fishermen with some whitewater boating and trout fishing. Access is mainly by boat and foot. The railroad parallels the entire length of this section. Motorized boating is allowed in Segment 4, and most of the use is by motorized boat. A total of 14,636 boaters (both commercial and private) used Segment 4 between May 15 and October 15, 2001. This represents a 25.3% decrease from the 1990 base figure (19,600). This river segment is open to both trout and steelhead fishing the entire year (ODFW 2002).

Professional guides and outfitters use motorized boats as well as inflatable rafts and drift boats to transport fishermen and other recreationists (whitewater rafters, *etc.*) on the river. Currently no motorized boating is allowed upstream from Sherars Falls. Motorized use is allowed from Buckhollow Creek (RM 43 to approximately 1 mile downstream from Sherars Falls) to Heritage landing (near the mouth of the Deschutes River) from October 1 to June 14. From June 15 to September 30, motorized use is allowed only from Macks Canyon (RM 24.0) downriver to the mouth of the Deschutes River and only on an alternating schedule where use every other Thursday through Sunday is restricted.

All commercial permittees are required to comply with the list of stipulations issued with the BLM's *Special Recreation Application and Permit* (Form 8370-1, May 1996), many of which are meant to protect aquatic resources. Stipulations which relate directly to aquatic resource protection include: (1) Prohibition of camping on islands, (2) "leave no trace" camping principles, (3) closure of certain areas to camping and boat launching or take-out, (4) requirement to carry out human waste and all other waste generated as a result of the permitted use, (5) prohibition of washing dishes or using soap within 50 feet of any spring or tributary stream, (6) prohibition of the removal of native materials (vegetation, rocks, *etc.*) from the river, and (7) restriction of maximum party size to 16 people on river Segments 1, 3, and 4, and 24 people on river Segment 2.

In accordance with the 1999 terms and conditions (NOAA Fisheries 1999), the BLM has posted all boat launches and other areas throughout the Deschutes Corridor with flyers that describe steelhead redds, describe where redds may be located, and encourage users to avoid redds. Information is also provided to each guide and outfitter, and semiannual meetings are held with guides and outfitters to discuss the effectiveness of efforts to protect MCR steelhead.

Emergency Boat Removal.

Boats occasionally get wrapped around rocks or debris in the lower Deschutes River creating a safety hazard by blocking popular routes through rapids. Boats are removed using a block and tackle to work them off of the rock or debris. A jet boat is used to maneuver around the wreck.

Road Maintenance.

The BLM maintains the Deschutes River access road downstream from Maupin, Oregon (RM 51.5) for 27 miles, and upstream from Maupin, Oregon for 7 miles. The BLM also performs periodic maintenance on the 2-mile stretch of dirt road from Warm Springs, Oregon to Mecca Flat (RM 95.3). Road maintenance activities include blading gravel, placing gravel, maintenance and repair of ditches and other drainage structures, vegetation management (brushing and limbing), and resealing an aggregate surface. Some road maintenance is specifically designed to reduce runoff from roads to streams. No dumping of waste material resulting from road maintenance activities is permitted in riparian areas or in areas from which sediment could enter streams.

Steelhead Spawning Ground Surveys.

BLM fisheries personnel conduct annual steelhead spawning ground surveys on Macks Canyon, Ferry Canyon, Oak Brook, Buck Hollow, and Tenmile Creeks. Macks Canyon (RM 24), Ferry Canyon (RM 25), Oak Brook (RM 35), and Buck Hollow (RM 43) Creeks all enter the Deschutes River within Segment 3. Tenmile Creek is a tributary to Trout Creek which enters the river at RM 87, the boundary between Segments 1A and 1B. Since it is necessary to attempt to identify both hatchery and wild steelhead spawners, it is sometimes necessary to disturb the fish in order to get a clear view of the adipose fin. Hatchery fish can be differentiated from wild fish by the absence of the adipose fin, which is clipped off prior to their release from the hatchery. ODFW estimates that in recent years, the percentage of hatchery strays in the Deschutes River has exceeded 70%, and most of these are believed to be long-distance strays from outside the ESU. It is stated in NOAA Fisheries (1997b) that “one of the most significant sources of risk to steelhead in the Middle Columbia ESU is the recent and dramatic increase in the percentage of hatchery fish in natural escapement in the Deschutes River Basin.” Therefore, it is important to continue to distinguish between hatchery and wild steelhead on the spawning grounds to determine if this trend continues.

1.3 Biological Information

The listing status and biological information for MCR steelhead are described in Busby *et al.* (1996).

According to the BA, documented spawning and rearing areas for MCR steelhead on BLM lands are at various locations along the mainstem Deschutes River, in several tributaries (Bakeoven, Buck Hollow, Jones Canyon, Macks Canyon, Nena, Oak Brook, Tenmile, and Trout Creeks), and in the lower two miles of the White River. MCR steelhead also incubate, feed, and migrate in these waters. MCR steelhead are also suspected but not confirmed to spawn in several other Deschutes River tributaries (Cottonwood, Deep, Ferry Canyon, and Ward Creeks). Historically,

MCR steelhead are thought to have spawned in Bronx Canyon, Bull Run, Cove, Fall Canyon, and Sixteen Canyon Creeks in the Deschutes River basin. Based on limited spawning ground counts in the mainstem Deschutes and tributaries, it is believed that mainstem spawning accounts for 30% to 60% of natural production in the Deschutes River basin.

According to the BA, MCR steelhead spawn in the Lower Deschutes River and the west side tributaries of the Deschutes River from March through June, while spawning in the east side tributaries occurs from January through mid-April. Fry emergence timing depends on time of spawning and water temperature during egg incubation, but usually occurs from late May through June. Therefore, some life stage of MCR steelhead is present in the Deschutes River system throughout the year.

Those MCR steelhead that spawn in the mainstem Deschutes River typically spawn near the downstream ends of islands or on the shallow water side between the island and the streambank. The mean water depth at which 28 MCR steelhead redds were located in the mainstem Deschutes River was 54.1 centimeters, mean water velocity over those redds was 71.4 centimeter/second, and mean gravel size in which the redds were constructed was 32.5 mm in diameter (Zimmerman and Reeves 1998). Determining specific locations of steelhead redds in most sections of the mainstem Deschutes River is difficult or impossible during most years, because of high flows and turbidity when steelhead are spawning¹. The 2000 BLM monitoring report (BLM 2000) stated that the mainstem Deschutes River steelhead spawning surveys were difficult and of limited use because of poor visibility created by high water during the spring. The report also stated that ODFW and the Confederated Tribes of Warm Springs (CTWS) have attempted to conduct steelhead spawning surveys on the mainstem Deschutes River and discontinued them due to the difficulty of observing redds.

Juvenile MCR steelhead rear throughout the mainstem Deschutes downstream from Pelton Reregulating Dam. They utilize streamside vegetation as well as stream substrate and other instream structure as cover. Sampling (electrofishing) conducted by Zimmerman and Reeves (1999) in the mainstem Deschutes River found that resident rainbow trout fry (young-of-the-year) outnumbered steelhead fry by a proportion of approximately 9.5 to 1. The proportion of Age 1+ and older juvenile resident rainbow trout to juvenile steelhead was approximately 9 to 1.

1.4 Evaluating the Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA, as defined by 50 CFR Part 402 of the implementing regulations. NOAA Fisheries discusses the analysis necessary for application of these standards in the particular contexts of the Pacific salmonids in the August 26, 1999 Habitat Approach document (NOAA Fisheries 1999). This analysis involves the following steps: (1) Define the biological requirements of the species; (2) evaluate the environmental baseline relative to the species' current status; (3) determine the effects of the

¹Telephone Conversation between Ron Lindland, NOAA Fisheries, and Jim Eisner, Fishery Biologist, BLM (June 22, 1999).

proposed or continuing action on the species; (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the environmental baseline and any cumulative effects, and considering measures for survival and recovery specific to other life stages; and (5) identify reasonable and prudent alternatives to a proposed or continuing action that is likely to jeopardize the continued existence of the species.

In summary, for migration, spawning and rearing habitat, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of MCR steelhead attributable to the proposed action. NOAA Fisheries' habitat analysis considers the extent to which the proposed action impairs the function of habitat indicators necessary for productive migration, spawning, and rearing of MCR steelhead.

1.4.1. Biological Requirements

To fully consider the current status of the listed species (50 CFR section 402.14(g)(2)), NOAA Fisheries evaluates the species-level biological requirements of a species, subspecies or a distinct population segment level. For Pacific salmonids, NOAA Fisheries evaluates species level biological requirements as they relate to the distinct population segment level, or evolutionary significant unit (ESU). The biological requirements and the status of listed species are evaluated at both the ESU level and the action area level, and may be described in a number of different ways. For example, biological requirements can be expressed in terms of population viability using such variables as the ratio of recruits to spawners, a survival rate for a given life stage, a positive population trend, or a threshold population size. Biological requirements can also be described as the habitat conditions necessary to ensure the species' continued existence, and these can be expressed in terms of physical, chemical, and biological parameters (NOAA Fisheries 1999). These are briefly described below.

1.4.1.1 Population Viability

Since 1995, NOAA Fisheries has employed the viable salmonid population (VSP) concept as a tool to evaluate whether the species level biological requirements of ESUs are being met. VSPs are independent populations that have a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over 100 years (McElhany *et al.* 2000).

The attributes associated with VSPs include adequate abundance, productivity, population growth rate, population spatial scale, and diversity. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle and are therefore distinguished from the more specific biological requirements associated with the action area and the particular action under consideration. Species-level biological requirements are influenced by all actions affecting the species throughout its life cycle, and may be broader than the requirements of any specific independent population in the ESU. The action area effects must be reviewed in the context of these species-level biological requirements to evaluate the potential for survival and

recovery, relevant to the status of the species and given the comprehensive set of human activities and environmental conditions affecting the species. Recent information reviewed by NOAA Fisheries indicates that the species level biological requirements are not being met in any of the ESUs studied for 12 species of listed salmonids in the Columbia-Snake River basins (NMFS 2000). Given the low abundance levels in these ESUs, population growth rates must increase to reach the critical threshold or recovery abundance levels, and in the long term, must remain high enough to maintain a stable return rate and keep populations at acceptable abundance levels (NMFS 2000).

1.4.1.2 Habitat Elements

Habitat-altering actions continue to affect salmon and steelhead population viability by affecting the physical, chemical, and biological parameters central to salmon survival in freshwater ecosystems (NMFS 1999). For actions that affect freshwater habitat, NOAA Fisheries defines the biological requirements of the species in terms of a concept called properly function condition (PFC). Proper functioning condition is the sustained presence of natural habitat forming processes in a watershed that are necessary for the long-term survival and recovery of MCR steelhead through the full range of environmental variation. Natural habitat forming processes include, but are not limited to, bedload transport, large woody debris recruitment, and riparian vegetation succession, and most of these processes are driven by water. PFC constitutes the habitat component of a species' biological requirements.

However species biological requirements are expressed-whether in terms of population variables or habitat components-there is a strong causal link between the two (NMFS 1996). Actions that affect habitat have the potential to effect population abundance, productivity and diversity, and these impacts can be particularly acute when populations are at low levels. The importance of this relationship is highlighted by the fact that freshwater habitat degradation is identified as a factor for decline in every salmon listing on the West Coast (NMFS 1996). With respect to the analysis of Federal actions on listed species, by analyzing the effects of a given action on the habitat portion of a species biological requirements, NOAA Fisheries is able to gauge how that action will affect the population variables that constitute the rest of a species' biological requirements, and ultimately, how the action will affect the species' current and future health.

1.4.2. Environmental Baseline

Current range-wide status of MCR steelhead.

NOAA Fisheries described the current population status of the MCR steelhead in its status review (Busby *et al.* 1996).

Action Area.

The “action area” is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR 402.02). The "action area" for this consultation, therefore, includes the mainstem Deschutes River from Pelton Reregulating Dam downstream to its mouth and all tributaries in that reach which flow through or adjacent to BLM land.

Current status of MCR steelhead under environmental baseline within the action area.

The current population status and trends for MCR steelhead are described in Busby *et al.* (1996). ODFW (1997) listed the Pelton/Round Butte hydroelectric complex, low summer flows and high water temperatures in tributary streams, and stream bank degradation as production constraints on MCR steelhead in the Lower Deschutes River. Sedimentation (resulting mainly from glacial flour from Mount Hood glaciers) in the mainstem Deschutes downstream from White River (River Mile 47) could cause spawning gravel for MCR steelhead to become less useable and could negatively impact aquatic insect production, decreasing juvenile salmonid production potential. Table 1 displays the results of spawning surveys conducted for Buck Hollow Creek and Bakeoven Creek from 1990 through 2002. The number of redds increased considerably from 1990 to 2002.

Table 1. Summer Steelhead Redd Counts for Buck Hollow Creek and Bakeoven Creek from 1990 to 2002. Adapted from ODFW (2002) Tables 11 and 12.

Stream	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Buck Hollow Cr.	85	72	34	48	8	69	65	136	179	152	110	445	221
Bakeoven Cr.	22	8	9	21	13	20	35	57	68	89	83	480	214

Implementation of standards developed as a result of decisions described in the BLM’s 1993 Lower Deschutes River Management Plan regarding livestock grazing, off-road vehicle management, and management of undeveloped campsites have resulted in improvements in riparian vegetation conditions on BLM lands along the Lower Deschutes River and some of its tributaries. Several campsites within riparian areas have been closed and others are being actively rehabilitated to assist in vegetative recovery. Many of the plan’s decisions focus on controlling recreation use and protecting riparian and fisheries habitats.

Environmental baseline conditions within the action area were evaluated for the proposed action at the project site and watershed scales. This evaluation was based on the “matrix of pathways and indicators” (MPI) described in *Making Endangered Species Act Effects Determinations for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). This method assesses the current condition of instream, riparian, and watershed factors that collectively provide properly

functioning aquatic habitat essential for the survival and recovery of the species. For the purposes of this consultation, streams within the action area were separated into six groups. These are: (1) Lower Deschutes River; (2) Macks Canyon, Jones Canyon, Bakeoven Creek, Buck Hollow Creek, Ferry Canyon, and Oakbrook Canyon; (3) Gordon Canyon, Harris Canyon, Sixteen Canyon, Box Elder Canyon, Rattlesnake Canyon, Cove Creek, Fall Canyon, Bull Run Canyon, Dry Canyon, and Craft Canyon; (4) Wapinitia Creek, Cottonwood Creek, and Deep Creek; (5) Trout Creek and Tenmile Creek; and (6) White River.

In the Lower Deschutes River mainstem(RM 0 to RM 100) (stream group 1 from aforementioned list), 11 of the 16 habitat indicators for which data were available were rated as properly functioning, based on thresholds presented in NOAA Fisheries' MPI. Water temperature, chemical contamination/nutrients, and physical barriers were rated as not properly functioning, while road density and location and drainage network increase were rated as functioning at risk. Summer water temperatures as high as 76°F have been recorded at RM 1. The Lower Deschutes is on the Oregon Department of Environmental Quality (ODEQ) Clean Water Act Section 303(d) list because of low dissolved oxygen levels and pH. On the mainstem Deschutes River, the Pelton/Round Butte dam prevents MCR steelhead from reaching historic spawning and rearing habitat.

In stream groups 2-5 of the list (all tributaries to the Deschutes River), water temperature, large wood, pool frequency, width/depth ratio, and peak flow/base flow habitat indicators are rated as not properly functioning. Sediment/turbidity, chemical contamination/nutrients, substrate embeddedness, and pool quality indicators are rated as at risk or not properly functioning for these tributary streams.

For the White River (stream group 6), which enters the Deschutes River at RM 47, 9 of the 16 habitat indicators were rated as properly functioning. Water temperature and sediment/turbidity were rated as not properly functioning. Maximum water temperatures reach 75°F. Since the White River originates on the slopes of Mt. Hood, the glacial flour content is high. A 50-foot high natural waterfall at RM 2 of the White River blocks upstream migration for anadromous fish.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Actions

The effects determination in the BA was made using a method for evaluating current aquatic conditions (the environmental baseline) and predicting effects of the action on them. This process is described in the document *Making ESA Determinations at the Watershed Scale* (NMFS 1996). This assessment method was designed for the purpose of providing adequate information in a tabular form in BAs for NOAA Fisheries to determine the effects of actions subject to consultation. The effects of the actions are expressed in terms of the expected effect (restore, maintain, degrade) on each of 16 aquatic habitat factors in the action area, as described in the "checklist for documenting environmental baseline and effects of the action" (checklist)

completed for each action and watershed. The results of the completed checklist for the action provides a starting point for determining the overall effect of the action on the environmental baseline in the action area.

Guide and Outfitter Program and Emergency Boat Removal.

The primary effect of commercial boating on MCR steelhead in the mainstem Deschutes River would be the disturbance of spawning adults. It is believed that repeated disturbance of spawning adult salmon and steelhead by boats passing near the fish may cause the fish to abandon their redds or may stress spawning fish such that only a portion of eggs are deposited. Dufour (1995) found that 11% of the watercraft (inflatable rafts, kayaks, and inflatable kayaks) that passed by spawning spring/summer chinook salmon in the Upper Salmon River in Idaho caused fish to move from their redds. All of these fish returned to their redds within a short time. NOAA Fisheries is not aware of any studies regarding the effects of disturbance on spawning adult steelhead by boaters.

A second potential effect of activities associated with boating would be anglers or other recreationists (whitewater rafters, *etc.*) actually stepping on MCR redds while eggs or alevins are in the gravel. Roberts and White (1992) found that humans stepping on salmonid redds can measurably decrease egg-to-emergent fry survival. ODFW angling regulations prohibit fishing from a floating device in the Deschutes River. Since anglers are required to leave their boats to fish, some wading is necessary. As discussed above, MCR steelhead typically spawn in water less than two feet in depth and in close proximity to islands where anglers could easily wade. Therefore, there is a potential that anglers or other recreationists could step on MCR steelhead redds.

A third potential effect of commercial boating on MCR steelhead in the mainstem Deschutes River would be the displacement of juveniles from streambank cover to open water where they could momentarily become more susceptible to predation by larger resident trout or northern pikeminnow. Satterthwaite (1995), in a study conducted in the Rogue and Chetco rivers in southwestern Oregon, found that most juvenile chinook and Age 1+ juvenile steelhead reacted when boats pass directly overhead. A startle response (a quick dart by the fish) was the most common behavior of fish passed by motorboats and driftboats, while an avoidance response (slow or moderate movement away from the boat) was the most common behavior observed among fish passed by kayaks. In contrast, few juvenile salmonids exhibited behavioral responses when boats passed at a lateral distance of 5 meters or more from the fish. Although no studies were found which addressed the subject, juvenile steelhead might also be flushed from cover by wading anglers or other recreationists, and by boat mooring or launching activities.

Although the possibility does exist that juvenile steelhead flushed from cover by boats or wading humans may become momentarily more susceptible to predation by other larger fishes or avian predators, NOAA Fisheries believes that the probability of incidental take resulting from these activities is minimal. In a study conducted on the Rogue River in southwest Oregon, Satterthwaite (1995) found that tour-boat operations had minimal effect, if any, on the susceptibility of juvenile salmonids to predation by northern pikeminnow. As mentioned above,

Zimmerman and Reeves (1999) found that young-of-the-year and juvenile resident trout outnumber young-of-the-year and juvenile steelhead in the Deschutes River by approximately 9.5 to 1, which greatly reduces the odds that steelhead would be selected as prey. In addition, juvenile whitefish (*Prosopium williamsoni*), dace (*Rhinichthys spp.*), sucker (*Catostomus spp.*), chiselmouth (*Acrocheilus alutaceus*), redbelly darter (*Richardsonius balteatus*), and northern pikeminnows (*Ptychocheilus oregonensis*) are also present in the Deschutes River and available as prey for larger salmonids, which further reduces the likelihood of juvenile steelhead being selected as prey. The BA reports that riparian vegetation monitoring on BLM lands indicates that streambank cover is adequate and improving along most reaches of the Deschutes River so that a juvenile steelhead flushed from one location would likely be able to escape to other cover before being eaten by predatory species.

Motorized boating and/or floatboating on the river is not expected to degrade any of the habitat indicators listed in the MPI. Small amounts of sediment could enter the river from user created trails and areas where boats have been pulled up on shore and a small amount of riparian vegetation could be removed due to these same activities. However, because of the size and flow of the Deschutes River and the small amount of area disturbed, both the sediment/turbidity indicator and the water temperature indicator would be minimally affected.

Road Maintenance.

Because of the proximity of the road to the Deschutes River at several locations both upstream and downstream from Maupin, Oregon, routine road maintenance activities could result in small amounts of sediment entering the river. Maintenance of the Deschutes River access road could also result in limited sediment input at the mouths of tributary streams which the road crosses. The road and some associated bank stabilization structures along the river are also preventing the establishment of riparian vegetation in some areas.

Beneficial effects occur where road maintenance reduces the potential for catastrophic erosion and delivery of large amounts of sediment to stream channels. Severe erosion is almost inevitable if roads are not regularly maintained, and thus regular maintenance is a high priority. Failure to properly maintain road drainage can result in much larger sediment inputs to streams than those resulting from the maintenance work.

Steelhead Spawning Ground Survey.

Since it is necessary to identify hatchery and wild adult steelhead on the spawning grounds, it is sometimes necessary to disturb the fish in order to get a better view of the adipose fin area. Under the ESA, such disturbance may fall under the definition of "harassment." However, since the BLM only conducts steelhead spawning surveys once each year on each stream surveyed, harassment is expected to be minimal.

1.5.2 Cumulative Effects

"Cumulative effects" are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action

area of the Federal action subject to consultation." The action area for this consultation includes the Lower Deschutes River and its tributaries on BLM land downstream from Pelton Reregulating Dam. The BLM identified no specific private or state actions that are reasonably certain to occur in the future that would affect MCR steelhead or their habitat within the action area. Since the BLM is the primary manager (171,849 acres) of the land along the Lower Deschutes River, Federal actions are more likely to dominate stream conditions.

Significant improvement in MCR steelhead reproductive success outside of BLM land is unlikely without changes in grazing, agricultural, and other practices occurring within these non-federal riparian areas along the Lower Deschutes River and its tributaries. Given that the MCR steelhead is listed as threatened, NOAA Fisheries assumes that non-federal land owners will take steps to curtail or avoid land management practices that would result in the take of MCR steelhead. However, NOAA Fisheries is not aware of any specific future actions which are reasonably certain to occur on non-federal lands. Until improvements in non-federal land management practices are actually implemented, NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years.

1.6 Conclusion

After reviewing the best available scientific and commercial information available regarding the current status of the MCR steelhead ESU considered in this consultation, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NOAA Fisheries' opinion that the action as proposed, is not likely to jeopardize the continued existence of this species.

Our conclusions are based on the following considerations: (1) Juvenile MCR steelhead startled by boats and fishermen can take cover in abundant overhanging riparian vegetation to avoid predators; (2) taken together, the conservation measures applied to each project will ensure that any short-term effects to water quality, habitat access, habitat elements, channel conditions and dynamics, flows, and watershed conditions will be brief, minor, and timed to occur at times that are least sensitive for the species' life-cycle; (3) harassment from spawning surveys will be minimal since each stream is surveyed only once each year; and (4) the individual and combined effects of all actions permitted in this way are not expected to impair currently properly functioning habitats, appreciably reduce the functioning of already impaired habitats, or retard the long-term progress of impaired habitats toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

1.7 Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species or to develop additional information. NOAA Fisheries has no conservation recommendations to make at this time.

1.8 Reinitiation of Consultation

Reinitiation of consultation is required if: (1) The action is modified in a way that causes an effect on the listed species that was not previously considered in the BA and this Opinion; (2) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; (3) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16); or (4) if the action is not consistent with the broadscale Land and Resource Management Plan consultation in progress.

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. “Harm” is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. “Harass” is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. “Incidental take” is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1 Amount or Extent of Take

NOAA Fisheries anticipates that the subject actions covered by this Opinion are reasonably certain to result in incidental take of MCR steelhead. Some level of incidental take is expected to result from disturbance of spawning adult steelhead, frightening of juvenile MCR steelhead from cover such that they may become more susceptible to predation, and the potential for anglers and other recreationists associated with commercial and private motor and float boating to actually step on MCR steelhead redds. Some minimal amount of take may also result from the transport of sediment to the Deschutes River resulting from routine road maintenance. In addition, some harassment of adult MCR steelhead may occur during annual MCR steelhead spawning ground surveys conducted by the BLM. Because of the inherent biological characteristics of aquatic species such as MCR steelhead, the likelihood of discovering take attributable to these actions is very small. Effects of actions such as those addressed in this Opinion are largely unquantifiable in the short term, and may not be measurable as long-term

effects on the species' habitat or population levels. Therefore, even though NOAA Fisheries expects some incidental take to occur (primarily through harassment) due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take of listed fish at any life stage.

Based on the information in the BA and additional information provided by the BLM, NOAA Fisheries anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Opinion. To ensure protection for a species assigned an unquantifiable level of take, reinitiation of consultation is required as stated above. This incidental take statement shall be in effect for the duration of the actions covered by this Opinion.

2.2 Effect of the Take

In this Opinion, NOAA Fisheries has determined that the level of anticipated take is not likely to result in jeopardy to MCR steelhead when the reasonable and prudent measures are implemented.

2.3 Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of take of MCR steelhead resulting from the actions covered by this Opinion.

1. The BLM shall regulate/manage commercial and private motor boaters, float boaters, and other recreationists using the Lower Deschutes River such that disturbance of holding and spawning adult and rearing juvenile MCR steelhead, and stepping on MCR steelhead redds is avoided or minimized.
2. The BLM shall utilize Best Management Practices which avoid or minimize sediment entering streams as a result of routine road maintenance procedures.
3. The BLM shall minimize harassment of adult steelhead and stepping on redds during annual spawning ground surveys.
4. The BLM shall monitor the effectiveness of the proposed action in achieving the stated purpose and the effectiveness of conservation measures in minimizing take and report annually to NOAA Fisheries.

2.4 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures

described above. These terms and conditions are non-discretionary. The BLM shall do the following:

1. To implement Reasonable and Prudent Measure #1 (regulate and manage boaters and recreationists), the BLM shall:
 - a. Inform (in writing as an attachment to the permit as well as by posting signs at all boat launch areas) all commercial and private motor boaters and float boaters that spawning adult MCR steelhead and/or their redds are or may be present in certain areas of the Deschutes River from March 15 to July 15, that MCR steelhead are listed as threatened under ESA, and that spawning adults and redds should be avoided and protected.
 - b. Inform (in writing as an attachment to the permit as well as by posting signs at all boat launch areas) all commercial and private motor boaters and float boaters that juvenile MCR steelhead utilize shoreline vegetation, logs, rootwads, and other structure as cover; that these juvenile fish may become more susceptible to predation when flushed from that cover; that these species are listed as threatened under ESA; and that disturbance of these areas should be minimized.
 - c. Inform other recreationists (campers, shore anglers, hikers, etc.) by posting signs at all established campgrounds, the more popular dispersed campsites, trailheads, vehicle parking areas along access roads, etc. that spawning adult MCR steelhead and/or their redds are or may be present in certain areas of the Deschutes River from March 15 to July 15, that MCR steelhead are listed as threatened under ESA, and that spawning adults and redds should be avoided.
 - d. Inform other recreationists (campers, shore anglers, hikers, etc.) by posting signs at all established campgrounds, the more popular dispersed campsites, trailheads, vehicle parking areas along access roads, etc. that juvenile MCR steelhead utilize shoreline vegetation, logs, rootwads, and other structure as cover; that these juvenile fish may become more susceptible to predation when flushed from that cover; that these species are listed as threatened under ESA; and that disturbance of these areas should be minimized
2. To implement Reasonable and Prudent Measure #2 (road management BMPs) above, the BLM shall:
 - a. Dispose of waste material generated from road maintenance activities in stable sites only.
 - b. Not dispose of waste material generated from road maintenance activities on active floodplains.
 - c. Maximize maintenance activities during the dry season to avoid wet periods.
 - d. Where sediment risks warrant, use filter strips (straw bales or similar materials).
 - e. Leave vegetation in ditches and at stream crossings, when possible.

- f. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through use of filter materials (such as straw bales or silt fencing) if vegetation strips are not available.
 - g. Refuel power equipment at least 150 feet from water bodies to prevent direct delivery of contaminants into associated water bodies.
 - h. Avoid application of dust abatement materials within 25-feet of a water body or stream channel. Pumping of water used in dust abatement activities from pump chances will meet NOAA Fisheries' screen criteria.
 - i. Clean ditches and culverts of materials resulting from slides or other debris using the technique that minimizes the amount of soils exposed and that is least disruptive to riparian vegetation.
3. To implement Reasonable and Prudent Measure #3 (minimize harassment of redds), the BLM shall:
- a. Conduct redd surveys only on days when light conditions and water clarity provide good visibility of redds and spawning fish.
 - b. Maximize visibility of redds and spawning fish by wearing good quality polarized sunglasses when conducting spawning surveys.
 - c. Avoid wading in pool tailouts or other areas of the stream where MCR steelhead are most likely to construct redds.
 - d. Limit the amount of effort expended (and thus the amount of harassment of the fish) in trying to differentiate between hatchery and wild steelhead.
 - e. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through use of filter materials (such as straw bales or silt fencing) if vegetation strips are not available.
 - f. Refuel power equipment at least 150 feet from water bodies to prevent direct delivery of contaminants into associated water bodies.
 - g. Avoid application of dust abatement materials within 25 feet of a water body or stream channel. Pumping of water used in dust abatement activities from pump chances will meet NOAA Fisheries screen criteria.
4. To implement Reasonable and Prudent Measure #4 (monitoring and reporting), the BLM shall:
- a. Monitor effectiveness of providing information/education materials. Provide a written report to NOAA Fisheries by November 1 each year documenting the results of monitoring.
 - b. Provide a written report to NOAA Fisheries by November 1 each year documenting any emergency boat removal that was performed.
 - c. Provide a written report to NOAA Fisheries by November 1 each year documenting road maintenance activities and the effectiveness of road maintenance terms and conditions.

- d. Provide a written report to NOAA Fisheries by November 1 each year documenting redd survey results.
- e. Submit the monitoring report to:
Scott Hoefer
Oregon Habitat Branch
NOAA Fisheries
re: 2002/00018
525 NE Oregon Street, Suite 500
Portland, OR 97232-2737

3. MAGNUSON-STEVENSON ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA [6 USC 1855(b)] requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;
- NOAA Fisheries shall provide conservation recommendations for any Federal or state Activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reason for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed actions are detailed above in section 1.2. The proposed actions are the implementation of the guide and outfitter permit program, emergency boat removal, road maintenance, and steelhead spawning ground surveys on BLM-administered lands within the Deschutes Resource Area for 2002, 2003, and 2004. The action area for this consultation includes the mainstem Deschutes River from Pelton Reregulating Dam, downstream to its mouth and all tributaries within that reach which flow through or adjacent to BLM land. Streams within the Lower Deschutes River subbasin are part of the proposed designated EFH for chinook salmon (PFMC 1999). Both spring and fall chinook salmon occur in the Lower Deschutes River subbasin. A description and identification of EFH for salmon is found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of the impacts to chinook salmon EFH from the subject action is based on this information.

The objective of this EFH consultation is to determine whether the implementation of the guide and outfitter permit program, emergency boat removal, road maintenance, and steelhead

spawning ground surveys on the DRA is likely to adversely affect EFH for chinook salmon in the Lower Deschutes River subbasin.

3.5 Effects of the Proposed Actions

As described in detail in the ESA portion of this consultation, the proposed activities may result in detrimental, short-term, adverse effects to a variety of habitat parameters.

3.6 Conclusion

The NOAA Fisheries believes that the proposed action may adversely affect the EFH for chinook salmon.

3.7 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. In addition to conservation measures proposed for the project by the BLM, all of the reasonable and prudent measures and the terms and conditions contained in section 2.4 of the ESA portion of this Opinion are applicable to salmon EFH. Therefore NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations..

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the BLM to provide a written response to NOAA Fisheries' EFH conservation recommendations within 30 days of its receipt of this letter. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. If the response is inconsistent with NOAA Fisheries' conservation recommendations, the BLM shall explain its reasons for not following the recommendations.

3.9 Supplemental Consultation

The BLM must reinitiate EFH consultation with NOAA Fisheries if the action is substantially revised in a manner that may adversely affect EFH or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR Section 600.920 [k]).

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this opinion in addition to the BA and additional information requested by NOAA Fisheries and provided by the Prineville BLM District.

- Bureau of Land Management; Bureau of Indian Affairs, Confederated Tribes of the Warm Springs Reservation; Oregon State Parks & Recreation Department; Oregon Department of Fish and Wildlife; Oregon State Marine Board; Oregon State Police; Deschutes River Management Committee; Wasco, Sherman, and Jefferson Counties; and City of Maupin. 1993. Final Lower Deschutes River Management Plan and Environmental Impact Statement—Volume I. January.
- Bureau of Land Management. 2000. 2000 ESA Monitoring Report for the Lower Deschutes River. Deschutes Resource Area, Pringle District BLM.
- Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I. V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NMFS-NWFSC-27. August.
- Dufour, J. 1995. Effects of Main Salmon River Floatboating Activities on Snake River Sockeye Salmon and Snake River Spring/Summer Chinook Salmon. Sawtooth National Recreation Area, Sawtooth National Forest. Biological Assessment. March.
- McElhany, P., M. Ruckelshaus, M. Ford, T. Wainwright, and E. Bjorkstedt. 2000. Viable Salmonid Populations and the Recovery of Evolutionary Significant Units. National Marine Fisheries Service, Northwest Fisheries Science Center, Draft Report.
- National Marine Fisheries Service (NOAA Fisheries). 1997b. Status Review Update for Deferred and Candidate ESUs of West Coast Steelhead. December.
- National Marine Fisheries Service (NOAA Fisheries). 1996. Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale. NOAA Fisheries, Environmental and Technical Services Division, Habitat Conservation Branch, 525 NE Oregon Street, Portland, Oregon.
- National Marine Fisheries Service (NOAA Fisheries). 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids. Guidance memorandum form Assistant Regional Administrators for Habitat Conservation and Protected Resources to staff. 13 pages. August. NOAA Fisheries, 525 NE Oregon Street, Suite 50, Portland, Oregon 97232-2737. (Available @ www.nwr.noaa.gov under Habitat Conservation Division, Habitat Guidance Documents.)
- National Marine Fisheries Service. 1999. Biological/Conference Opinion on Ongoing and Proposed Bureau of Land Management Activities Affecting Middle Columbia River Steelhead and Fall Chinook Salmon, Deschutes Resource Area, Lower Deschutes River, Oregon.

- National Marine Fisheries Service. 2000. Biological Opinion on the Operation of the Federal Columbia River Hydropower System.
- Oregon Department of Fish and Wildlife (ODFW). 1997. Lower Deschutes River Subbasin Management Plan. July.
- Oregon Department of Fish and Wildlife (ODFW). 2002. Oregon Sport Fishing Regulations.
- Oregon Department of Fish and Wildlife (ODFW). 2002. District Annual Report, Mid Columbia Fish District.
- PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Identification and Description of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.
- Roberts, B.C., and R.G. White. 1992. Effects of angler wading on survival of trout eggs and pre-emergent fry. North American Journal of Fisheries Management. 12:450-459.
- Satterthwaite, T.D. 1995. Effects of Boat Traffic on Juvenile Salmonids in the Rogue River. Oregon Department of Fish and Wildlife. Fish Research Project. Completion Report..December.
- Zimmerman, C.E., and G. H. Reeves. 1998. Steelhead and Rainbow Trout: Early Life History and Habitat Use in the Deschutes River, Oregon. 1997 Annual Report. U.S. Forest Service Pacific Northwest Research Station and Oregon State University.
- Zimmerman, C.E., and G. H. Reeves. 1999. Steelhead and Rainbow Trout: Early Life History and Habitat Use in the Deschutes River, Oregon. 1998 Annual Report. U.S. Forest Service Pacific Northwest Research Station and Oregon State University.